WHAT IS CLAIMED IS:

1. A method for improving disease diagnosis using contrast enhancement presentation comprising:

providing an input digital diagnostic image;

applying a decomposition filter bank to the input digital diagnostic image;

constructing a tone scale curve from the input digital diagnostic image;

applying said tone scale curve to the input digital diagnostic image to produce a tone-scaled image;

applying a decomposition filter bank to the tone-scaled image;

generating the contrast weight control signals from the input digital diagnostic image by extracting the high contrast edge signals at the coarse scale;

adjusting the decomposition outputs from both the input image and the tone-scaled image according to the contrast weight control signals; and

applying a reconstruction filter bank to the adjusted signals to produce a contrast enhancement presentation output image.

2. A method for improving disease diagnosis using mountain-view presentation comprising:

providing an input digital diagnostic image;

applying a decomposition filter bank to said digital diagnostic image to produce high contrast edge signals; and

outputting a mountain-view presentation image having mountains and plateaus wherein mountains are the areas containing high contrast edges and plateaus are the areas containing low frequency components.

3. A method for improving breast cancer diagnosis using mountain-view presentation comprising:

providing an input digital mammographic image;

applying a decomposition filter bank to said digital mammographic image to produce high contrast edge signals; and

outputting a mountain-view presentation having mountains and plateaus where mountains are the areas containing high contrast edges and plateaus are the areas containing low frequency components.

4. A method for improving breast cancer diagnosis using contrast enhancement presentation comprising:

providing an input digital mammographic image;

applying a decomposition filter bank to said input digital mammorgraphic image;

constructing a tone scale curve from said input digital mammographic image;

applying said tone scale curve to said input digital mammographic image to produce a tone-scaled image;

applying a decomposition filter bank to said tone-scaled image;

generating contrast weight control signals from the input digital mammographic image by extracting high contrast edge signals at the coarse scale;

adjusting decomposition outputs from both the input image and the tone-scaled image according to the contrast weight control signals; and

applying a reconstruction filter bank to the adjusted signals to produce a contrast enhancement presentation output image.

5. The method of claim 1 wherein said applying a decomposition filter bank to said input digital diagnostic image includes processing said image through a plurality of a pair of forward and reversed low pass, band pass and high pass filters.

6. The method according to claim 1, wherein said constructing a tone scale curve includes:

applying the decomposition filter bank to the input image to produce a high-passed input image at a coarse scale;

computing the gradient amplitude of the high-passed input image at a coarse scale;

computing a binary edge map image where value 1 represents the pixel being the local maximum gradient magnitude along the gradient direction and value 0 represents other pixels;

computing an image pattern histogram from the pixels belonging to the edge map with value 1 at a coarse scale;

finding a range that covers the most effective code values in the image pattern histogram; and

constructing the tone scale curve from the found range.

7. The method according to claim 1, wherein said generating the contrast weight control signals include:

applying the decomposition filter bank to the input image to produce a high-passed input image at a coarse scale;

computing an image gradient amplitude of the high-passed input image at the coarse scale; and

constructing a mask image weight factors W such that W produces larger gain factors when the gradient amplitude at the coarse scale is moderate and smaller gain factors when the gradient amplitude at the coarse scale is very small and very big.

8. A method of enhancing high contrast details of an input image for rendering it effectively on an output display medium comprising:

constructing a tone scale curve from the input image;

applying a tone scale curve to the input image to produce a tone-scaled image;

applying a decomposition filter bank to the tone-scaled image to produce the low-pass tone-scaled image;

applying the decomposition filter bank to the input image to produce the high-passed input image in each spatial scale;

generating the contrast weight control signals from the high-passed input image in each spatial scale;

adjusting the high-passed input image in each scale according to said contrast weight control signals; and,

applying a reconstruction filter bank to the low-pass tone-scaled image and the adjusted high-pass input image to produce a contrast enhancement presentation image for rendering on an output display medium.

9. The method according to claim 8, wherein said constructing a tone scale curve includes:

applying a decomposition filter bank to the input image to produce a high-passed input image at a coarse scale;

computing a gradient amplitude of the high-passed input image at the coarse scale;

computing a binary edge map image where value 1 representing a pixel being the local maximum gradient magnitude along the gradient direction and value 0 represents other pixels;

computing an image pattern histogram from the pixels belong to the edge map with value 1 at the coarse scale;

finding a range that covers the most effective code values in the image pattern histogram; and,

constructing the tone scale curve from the found range.

10. The method according to claim 8, wherein said generating contrast weight control signals includes:

applying a decomposition filter bank to the input image to produce a high-passed input image at a coarse scale;

computing a gradient amplitude of the high-passed input image at the coarse scale;

creating a mapping function that the output value T is large when the gradient amplitude at the coarse scale is moderate and the output value T is small when the gradient amplitude at the coarse scale is very small and very large; and,

creating a mask image of the weight factor G such that G produces large gain factors for the pixels in each scale whose corresponding gradient amplitudes at the coarse scale having large T values and small gain factors for the pixels in each scale whose corresponding gradient amplitudes at the coarse scale having small T values.

11. A method of enhancing high contrast details of an input image for rendering it effectively on an output display medium comprising;

constructing a tone scale curve from the input image;

applying the tone scale curve to the input image to produce the tone-scaled image;

applying a decomposition filter bank to the tone-scaled image to produce a low-pass tone-scaled image and a high-pass tone-scaled image in each spatial scale;

applying a decomposition filter bank to the input image to produce a high-pass input image at a coarse scale;

generating contrast weight control signals from the high-passed input image at the coarse scale and the high-passed tone-scaled image in each spatial scale;

adjusting the high-passed tone-scaled image in each scale according to the contrast weight control signals; and

applying a reconstruction filter bank to the low-pass tone-scaled image and the adjusted high-pass tone-scaled image to produce a contrast enhancement presentation image.

12. The method according to claim 11, wherein said constructing a tone scale curve includes:

applying a decomposition filter bank to the input image to produce a high-pass input image at a coarse scale;

computing the gradient amplitude of the high-pass input image at the coarse scale;

computing a binary edge map image where value 1 represents a pixel which is a local maximum gradient magnitude along the gradient direction and value 0 represents other pixels;

computing an image pattern histogram from the pixels belong to the edge map with value 1 at the coarse scale;

finding a range that covers the most effective code values in the image pattern histogram; and

constructing the tone scale curve from the found range.

13. The method according to claim 11, wherein said generating the contrast weight control signals includes:

applying a decomposition filter bank to the input image to produce a high-pass input image at a coarse scale;

computing a gradient amplitude of the high-passed input image at the coarse scale;

creating a mapping function that the output value T is large when the gradient amplitude at the coarse scale is moderate and the output value T is small when the gradient amplitude at the coarse scale is very small and very large; and

creating a mask image of the weight factor G such that G produces large gain factors for pixels in each scale whose corresponding gradient amplitudes at the coarse scale have large T values and small gain factors for pixels in each scale whose corresponding gradient amplitudes at the coarse scale have small T values.

14. The method according to claim 8 , wherein the high-pass filters used in the decomposition filter bank are edge detectors at different spatial scales.

15. The method according to claim 11. wherein the high-pass filters used in the decomposition filter bank are edge detectors at different spacial scales.

16. A method of extracting the breast skin line and the bounding box containing the breast region in a digital diagnostic image of a breast comprises:

determining whether the breast faces right or left by comparing the summation of the pixel values of the right and left sides of the image;

determining a candidate boundary by thresholding the image with a value close to the pixels of the air-background;

flipping the image if it faces the left;

searching for the skin line from the left (the chest wall side) on the candidate boundary image;

searching for the skin line from the right at the curvature bottom of the breast on the candidate boundary image;

linking and smoothing the skin line;

flipping the image back if it is facing to the left;

determining the coordinates of a bounding box containing pixels between the skin line and the chest wall; and

extracting the breast region according to said bounding box.